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10/810,638	03/29/2004	Jeffrey Shane Reiter	50103-554	9583

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EXAMINER	
MCDONALD, RODNEY GLENN	

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/810,638	REITER, JEFFREY SHANE	
	Examiner	Art Unit	
	Rodney G. McDonald	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10-14 and 16-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10-14 and 16-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 7 and 13 are indefinite because these claims recite other methods besides sputtering methods. The independent claims appear to limit the apparatus and method to sputtering since they have been amended to include cathode/target assemblies. Clarification is requested.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-8, 10-14, 16 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zejda (U.S. Pat. 5,228,968) in view of Maeda et al. (U.S. Pat. 5,620,523) and Ando et al. (U.S. Pat. 6,458,253).

Regarding claim 1, Zejda teach an apparatus for treating or processing at least one substrate/workpiece. (See Abstract; Figs. 1-4) A chamber 1 defining an interior space. (Column 2 line 50; Figs. 1-4) Mounting means adapted for positioning at least

one substrate/workpiece in the interior space of the chamber for receiving treatment in the plasma. (Column 2 lines 61-62; Figs. 1-4; plasma inherent to sputtering see Abstract) A gas supply means for injecting gas(es) into the interior of the chamber. (Column 3 lines 32-38) An outlet extending into the chamber for injecting gases into the interior space. (Column 3 lines 32-38) The apparatus comprises a spaced apart pair of cathode/target assemblies and mounting means positions at least one substrate/workpiece in the space between the pair of cathode/target assemblies and gas outlet portions positioned between the spaced apart pair of cathode/target assemblies. (Column 2 lines 58-60; Figs. 1-4)

Regarding claim 6, Zejda teach the interior of the chamber is to be maintained at a reduced pressure by a vacuum pump. (Column 2 line 56)

Regarding claims 7, 8, the apparatus is adapted to perform a plasma treatment or process of sputter deposition. (See Abstract)

Regarding claim 11, Zejda teaches a method of treating or processing at least one substrate/workpiece. (See Abstract; Fig. 1-4) Providing a chamber 1 defining an interior space for generating a plasma. (Column 2 line 50; Figs. 1-4) Mounting at least one substrate/workpiece in the interior space of the chamber for receiving treatment in the plasma between a spaced apart pair of cathode/target assemblies. (Column 2 lines 58-62; Figs. 1-4; plasma inherent to sputtering see Abstract) Injecting gas(es) into the interior of the chamber between the cathode/targets. (Column 3 lines 32-38) A plasma is generated because sputtering inherently requires it. (See Abstract) An outlet extending into the chamber for injecting gases into the interior space. (Column 3 lines

32-38) The apparatus comprises a spaced apart pair of cathode/target assemblies and mounting means positions at least one substrate/workpiece in the space between the pair of cathode/target assemblies and gas outlet portions positioned between the spaced apart pair of cathode/target assemblies. (Column 2 lines 58-60; Figs. 1-4) The substrate is sputter coated. (See Abstract)

Regarding claim 12, Zejda teach the interior of the chamber is to be maintained at a reduced pressure by a vacuum pump. (Column 2 line 56)

Regarding claims 13, 14, Zejda teach the apparatus is adapted to perform a plasma treatment or process of sputter deposition. (See Abstract)

Regarding claim 16, Zejda teach coating magnetic disks. (Column 1 lines 57-60)

The differences between Zejda and the present claims is that means for generating a plasma in the interior space of the chamber is not discussed (Claims 1, 11), an inlet portion extending exteriorly of the chamber is not discussed (Claims 1, 11), a pair of arcuately shaped tubular gas outlet portions is not discussed (Claims 1, 11), means for applying a bias potential to the gas supply means for suppressing plasma formation at the portion, wherein the means for applying a bias potential is electrically isolated from the means for generating a plasma is not discussed (Claim 1), means for electrically isolating the gas supply means from the chamber and the means for generating the plasma is not discussed (Claims 2, 11), the outlet portion of the gas supply means extends through an electrically insulated opening in a wall of the chamber is not discussed (Claim 3), means for applying the bias potential comprises means for applying a DC , AC, or RF bias potential is not discussed (Claim 4), means for applying

the bias potential comprises means for applying a selected polarity DC bias potential of up to about 1,000 V is not discussed (Claim 5), applying a bias potential to the gas supply means to suppress plasma formation at the at least one outlet orifice, wherein the gas supply means is electrically isolated from the means for generating a plasma is not discussed (Claim 11), injecting gas(es) into the interior space of the chamber by means of an electrically isolated gas supply means having an inlet portion extending exteriorly of the chamber and an outlet portion extending into the chamber via an electrically insulated opening in a wall of the chamber is not discussed (Claim 18), applying a DC, AC, or RF bias potential is not discussed (Claim 19) and applying a selected polarity DC bias potential of up to about 1,000V is not discussed (Claim 20).

Regarding means for generating a plasma in the interior space of the chamber (Claims 1, 11), Zejda discussed above teaches sputtering which inherently require a power supply means for generating a plasma to produce sputtering. (See Zejda discussed) If Applicant disputes this Ando et al. shows means (82) for generating a plasma in the interior space of a chamber for sputtering. (Column 12 lines 60-65; Column 13 lines 41-43)

Regarding inlet portion extending exteriorly of the chamber (Claims 1,11), Ando et al. teach an inlet portion extending exteriorly of the chamber. (Fig. 7; Column 13 lines 51-56)

Regarding a pair of arcuately shaped tubular gas outlet portions (Claims 1, 11), Zejda teach in Fig. 4 ring shaped gas supply means disposed between spaced apart targets. (See Fig. 4) Maeda et al. teach alternative ways to supply gas to a plasma

chamber. In Figs. 9A and 9B ring shaped gas supply means are used. Alternatively as shown in Figs 8A and 8B arcuate gas supply means can be utilized. (Column 8 lines 64-68; Column 9 lines 1-30)

Regarding the means for applying a bias potential to the gas supply means for suppressing plasma formation at the portion, wherein the means for applying a bias potential is electrically isolated from the means for generating a plasma (Claim 1), Ando et al. teach means (81) for applying a bias potential to the gas supply means for suppressing plasma formation at the at least one outlet orifice, wherein the means for applying the bias potential (81) is electrically isolated from the means (82) for generating the plasma. (Fig. 7; Column 12 lines 59-60; Column 13 lines 51-57; Column 16 lines 60-67)

Regarding the means for electrically isolating the gas supply means from the chamber and the means for generating the plasma (Claims 2, 11), Ando et al. show in Fig. 1A an insulating member 40 for electrically isolating the gas supply means from the chamber and the means for generating the plasma (i.e. target/cathode). (Column 5 lines 13-15; Column 5 lines 31-34; Column 6 lines 45-49)

Regarding the outlet portion of the gas supply means extends through an electrically insulated opening in a wall of the chamber (Claim 3), Ando et al. show the outlet portion of the gas supply means extending through an electrically insulating opening in a wall of the chamber. (Column 5 lines 13-15; Column 5 lines 31-34; Column 6 lines 45-49)

Regarding the means for applying the bias potential comprises means for applying a DC , AC, or RF bias potential (Claim 4), Ando et al. teach the means for applying the bias potential comprises means for applying a DC bias potential. (Column 12 lines 59)

Regarding the means for applying the bias potential comprises means for applying a selected polarity DC bias potential of up to about 1,000 V (Claim 5), Ando et al. teach the bias potential can be from +50V to -50V. (Column 23 lines 9-10)

Regarding applying a bias potential to the gas supply means to suppress plasma formation at the at least one outlet orifice, wherein the gas supply means is electrically isolated from the means for generating a plasma (Claim 11), Ando et al. teach means (81) for applying a bias potential to the gas supply means for suppressing plasma formation at the at least one outlet orifice, wherein the means for applying the bias potential (81) is electrically isolated from the means (82) for generating the plasma. (Fig. 7; Column 12 lines 59-60; Column 13 lines 51-57; Column 16 lines 60-67)

Regarding injecting gas(es) into the interior space of the chamber by means of an electrically isolated gas supply means having an inlet portion extending exteriorly of the chamber and an outlet portion extending into the chamber via an electrically insulated opening in a wall of the chamber (Claim 18), Ando et al. teach means (81) for applying a bias potential to the gas supply means for suppressing plasma formation at the at least one outlet orifice, wherein the means for applying the bias potential (81) is electrically isolated from the means (82) for generating the plasma. (Fig. 7; Column 12 lines 59-60; Column 13 lines 51-57; Column 16 lines 60-67) Ando et al. show in Fig. 1A

an insulating member 40 for electrically isolating the gas supply means from the chamber and the means for generating the plasma (i.e. target/cathode). (Column 5 lines 13-15; Column 5 lines 31-34; Column 6 lines 45-49)

Regarding applying a DC, AC, or RF bias potential (Claim 19), applying a DC bias potential. (Column 12 lines 59)

Regarding applying a selected polarity DC bias potential of up to about 1,000V (Claim 20), Ando et al. teach the bias potential can be from +50V to -50V. (Column 23 lines 9-10)

The motivation for utilizing arcuate gas supply means of Maeda et al. is that it allows for improving film uniformity. (Column 2 lines 16-17)

The motivation for utilizing the features of Ando et al. is that it allows for producing a thin film that suffers little damage from negative ions, positive ions, and electrons. (Column 2 lines 62-65)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Zejda with the features of Maeda et al. and Ando et al. is that it allows for depositing a film with uniformity and little damage.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zejda in view of Maeda et al. and Ando et al. as applied to claims 1-8, 11-14, 16, 18-20 above, and further in view of Suzuki et al. (U.S. Pat. 6,627,253).

The difference not yet discussed is reactive sputtering of a ferromagnetic target material in an oxygen-containing plasma to deposit an oxygen-containing ferromagnetic layer on each surface of the at least one substrate/workpiece. (Claim 17)

Regarding claim 17, Suzuki et al. teach sputtering a ferromagnetic target material in an oxygen-containing plasma to deposit an oxygen containing ferromagnetic layer on each surface of the at least one substrate/workpiece. (Column 8 lines 58-67; Column 9 lines 1-18)

The motivation for utilizing the features of Suzuki et al. is that it allows for reducing the media noise of the magnetic layer. (Column 7 lines 48-49)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized the features of Suzuki et al. because it allows for reducing the media noise of the magnetic layer.

Response to Arguments

Applicant's arguments filed December 10, 2007 have been fully considered but they are not persuasive.

At the outset it is noted that Applicant has amended the independent claims to include the limitations of former dependent claims 9 and 15 and to include arcuately shaped gas outlet portions. The arcuately shaped gas outlet portions were a limitation not present in the previously considered claim set. As such Applicant's amendment has necessitated a new ground of rejection. The Examiner uses Zejda as the primary reference with Maeda et al. and Ando et al. modifying Zejda. Zejda and Ando et al. have been presented and discussed before. Zejda represent the best teaching of the spaced apart targets. Ando et al. represent the best teaching of applying an electrical potential to the gas supply means. Maeda et al. teach the arcuate gas supply means

and utilizing arcuate gas supply means in place of ring gas supply means which Zejda specifically use. Now the Applicant's arguments will be discussed.

Response to the Arguments of the Claims Rejected Under 35 U.S.C. 102

In response to the argument that Ando et al. do not disclose a gas supply means for injecting gas(es) into the interior space of said chamber comprising an outlet portion extending into the chamber and including a pair of arcuately-shaped tubular gas outlet portions for injecting gas(es) into the interior space, and a spaced-apart pair of cathode/target assemblies and said mounting means positions at least one substrate/workpiece in the space between said pair of cathode/target assemblies, and the arcuately-shaped tubular gas outlet portions are positioned between the spaced-apart pair of cathode/target assemblies, as required by claim 1; and the steps of mounting/positioning at least one substrate/workpiece between a spaced-apart pair of cathode/target assemblies in the inter/or space of the chamber, and injecting gas(es) between the spaced-apart pair of cathode/target assemblies by means of an electrically isolated gas supply means having a pair of arcuately-shaped tubular gas outlet portions, as required by claim 11, it is argued that the 35 U.S.C. 102 rejection based on Ando et al. has been withdrawn. The arguments will be addressed in the 35 U.S.C. 103 rejection discussed below.

Response to the Arguments of the Claims Rejected Under 35 U.S.C. 103

In response to the argument that Zejda does not teach suggest a gas supply means for injecting gas(es) into the interior space of the chamber comprising an outlet

extending into the chamber and including a pair of arcuately-shaped tubular gas outlet portions for injecting gas(es) into the interior space, and the arcuately-shaped tubular gas outlet portions are positioned between the spaced-apart pair of cathode/target assemblies, as required by claim 1 ; and the step of injecting gas(es) between the spaced-apart pair of cathode/target assemblies by means of an electrically isolated gas supply means having a pair of arcuately-shaped tubular gas outlet portions, as required by claim 11, it is argued that Zejda teach in Fig. 4 ring shaped gas supply means between facing sputter targets for providing gas to the sputtering apparatus. Maeda et al. suggest utilizing in place of ring shaped gas means arcuate gas means for providing gas for a plasma apparatus. Therefore one of ordinary skill in the art would modify Zejda by utilizing the teachings of Maeda et al. because Maeda et al. suggest utilizing ring shaped gas means and arcuate gas means interchangeably in order to deposit uniform films. (See Zejda and Maeda et al. discussed above)

In response to the argument that it would not have been obvious to modify Ando et al. with the teachings of Zejda, it is argued that the Examiner has now made Zejda the primary reference because of the requirement for there to be arcuate gas introduction means. Maeda et al. make obvious the replacement of ring shaped means of Zejda with arcuate gas introduction means. However considering the combination of Zejda and Ando et al. one of ordinary skill in the art would know from Ando et al. to bias the gas introduction means of a sputtering apparatus such as Zejda. (See Zejda, Maeda et al. and Ando et al. discussed above)

In response to the argument that Suzuki et al. do not cure the deficiencies of Ando et al. and Zejda, it is argued that Suzuki et al. was relied upon to teach the limitations of claim 17. Zejda , Maeda et al. and Ando et al. teach the limitations of the other claims. (See Zejda, Ando et al., Maeda et al. and Suzuki et al. discussed above)

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M-Th with every Friday off..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rodney G. McDonald/
Primary Examiner, Art Unit 1795

Rodney G. McDonald
Primary Examiner
Art Unit 1795

RM
February 21, 2008